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AUTHOR Baecher, Richard E.; Coletti, Charles D.
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ABSTRACT

The two-way bilingual education program in Port Chester, New York, in which both native English-speaking and limited-English-proficient native Spanish-speaking students are given instruction in both languages, is described and its outcomes evaluated. Data on the performance of language-minority and language-majority students, gathered from norm-referenced tests and student interviews over three years, are displayed in 11 tables and analyzed in the text. In general, the findings support the use of the two-way bilingual program design for its emphasis on language learning as a resource rather than as a problem. Some less positive results in English language and mathematics development among native speakers are attributed to the complexity of implementing two curricula in one class. It is suggested that two-way bilingual programs, if properly monitored and supported, can recontextualize current second language education practices. (MSE)

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TWO-WAY BILINGUAL PROGRAM EFFECTS

Richard E. Baecher

Graduate School of Education
Language, Literacy & Learning Program
Fordham University at Lincoln Center
113 W. 60th Street
New York, NY 10023
(212) 841-5514

Charles D. Coletti

Port Chester Public Schools
P.O. Box 246
Port Chester, New York 10573
(914) 937-2655

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TWO-WAY BILINGUAL PROGRAM EFFECTS

RICHARD E. BAECHER, Fordham University at Lincoln Center, N.Y.
DR. CHARLES D. COLLETTI, Port Chester Public Schools

Our paper will share the instructional and non-instructional outcomes of Port Chester's Two-Way Bilingual Program. In operation since 1984, student achievement data in English and Spanish language learning will be reported. How did LEP students fare in the "Two-Way traffic?" How did EP (English-proficient) pupils perform in learning Spanish as a second language? Our results corroborate the benefits of a strong native language foundation and the beneficial effects on English-speaking children in learning a second language.

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Pretend for a moment that you are in a combined 2-3 elementary classroom with 18 children who come from such Latin American countries as Guatemala, Peru, Puerto Rico, Ecuador (to name only a few). The bilingual teacher has just begun a lesson on identifying words in Spanish as part of her formal reading lesson for the day; during the rest of the day she will continue to use their native language to teach her children concepts in reading, math, social studies, and science. At other times she will gradually introduce her children to learning English-as-a-second-language (ESL). This teacher has expertly integrated both English and Spanish within her curriculum. How did these children of limited-English proficiency (LEP) perform over a period of three years? To what extent did they learn English, and retain their native language?

Put yourself into another type of classroom activity within the same program. Now you are listening to American-born children learn to understand and speak Spanish. But there's something different here! Seated next to these children who are proficient in English are Hispanic children from the same grade levels as those mentioned in the previous paragraph. The bilingual and regular classroom teachers have planned an imaginative language lesson on ordering food in a local restaurant. The "child-waiters", who are proficient in Spanish, are taking orders in Spanish from their English-speaking classmates who are reading from a Spanish menu; all communication is conducted in Spanish for this part of the lesson. They reverse roles at another time where English is used to order food. How did the youngsters of English proficiency (EP) learn a second language during this 3-year enrichment program? And what about their own English-language development?

These two scenarios were typical of Port Chester's Two-Way Bilingual Program. Aware of the rapidly-changing demographics within one neighborhood near downtown Port Chester (almost reaching 70 percent Hispanic), and familiar with various models of bilingual and ESL programs from which to choose, administrators and staff opted to begin an innovative Two-Way Bilingual Program in 1984. Funded by the New York State Bureau of Bilingual Education between 1984-1987, Port Chester's program was one of 11 others within New York State to develop and implement this type of program (Perez, 1984; Bureau of Bilingual Education, 1984; N.Y. SABE, 1985).

A Two-Way Bilingual Program, in contrast with the more typical transitional bilingual education program (TBE) which keeps LEP pupils separated from their English-speaking peers until they acquire sufficient English-language skills "to make it" in the regular classroom, represents another viable and challenging opportunity for first- and second-language learning in schools whose communities are multicultural and linguistically diverse. According to Perez (1984), " a Two-Way Bilingual Education Program is one which employs two languages (one of which is English) for the purpose of instruction and involves students who are native speakers of each of those languages. Both groups of students (limited English proficient and English proficient) would be expected to become bilingual. In a Two-Way Bilingual Education Program, the students learn

curricula through their own language and through the second language, become proficient in their second language, and continue to develop skills and proficiency in their native language" (p.1).

Our paper, then, reports on how language-minority and language-majority pupils performed in one type of Two-Way Bilingual Program. We firmly believe that language programs designed along the lines of a "bilingual immersion" or "dual language" model can be developed that focus on language-learning-as-RESOURCE instead of language-learning-as-PROBLEM that somehow needs to be eradicated from children (Education Week, pp.7,24). From this perspective of language-learning-as-resource--that each individual's level of language ability can be used to mediate ideas and personal experiences as well as toprovide a social good for others--Two-Way programs can become effective vehicles to recontextualize language learning for minority and majority students in our society.

Our data were collected over a period of three years as required by the funding agency. Our approach was amply described in a previous article which reported the first-year results of this program (Baecher & Coletti, 1986). In this paper, we report the 3-year longitudinal results of the standardized test data as well as student perceptions of their classroom environment. Both data sets were collected between 1984-87. A pre-post evaluation design was required for all students in the program. Figure 1 summarizes the data collection instruments.

Figure 1. Standardized Instruments Employed To Measure Achievement Results and Student Perceptions of Port Chester's Two-Way Bilingual Program, 1984-87.

OBJECTIVE	INSTRUMENT	TARGET GROUP[a]
Spanish Reading Skills	Comprehensive Test of Basic SKills (CTBS-Espanol: Voc. + Comp.)	EP & LEP
English/Spanish Oral Language Skills	Bilingual Inventory of Natural Language (BINL: English for LEP; Spanish for EP)	LEP & EP
English Reading Skills	Stanford Diagnostic Reading Test (SDRT)	LEP
English Reading Skills	Stanford Achievement Test (SAT: Reading Comp.)	EP
Mathematics Skills (Spanish)	Comprehensive Test of Basic Skills (CTBS-Espanol: Total Math)	LEP
Mathematics Skills (English)	Stanford Achievement Test (SAT: Total Math)	EP
Student Perceptions of Classroom Environment	My Class Inventory (MCI in Spanish and English)	EP & LEP

[a] LEP=Limited-English Proficient; EP=English-proficient

Except for the MCI, standardized tests yielded raw scores which were

converted to normal curve equivalents (NCEs) for appropriate interval-level scaling. NCEs are the appropriate equivalent of percentiles and unlike percentiles, are preferred for statistical analysis because arithmetical operations can be performed only on equal-interval scales (Tallmadge, 1976). In addition, NCEs were used to calculate effect sizes to be described below.

The EP class included 15-17 students during the 3-year cycle. Since enrollments at any grade level were too low to form a single class, a combined 2-3 class was formed at the start of the project and was taught by the same teacher for the next three years. The teacher was responsible for teaching all subjects including reading, language arts, and a second language for both grades. All but two pupils were American-born and came from low to middle SES backgrounds. The LEP class consisted of 13-20 language-minority students who ranged from the grades 2-5 during the project duration. All had less than three years of schooling in the U.S. at the start of the project with the majority with less than one year. They came from Guatemala, El Salvador, Columbia, Mexico, Ecuador, Peru, Cuba, and Uruguay. Needless to say, varying levels of bilingual proficiency (in Spanish and English), different cultural experiences, and high rates of mobility characterized this LEP class. To highlight the mobility element, in the last year of the project, half the class was new to the program, with some students moving out of the districtor entering the nearby Catholic school.

Administrators, program teachers, and parents supported the program during itsthree years. In addition to learning a second language, native language use, and ESL, a unique feature of Port Chester's program was the cross-age, cross-cultural process whereby twice a week, EP and LEP children were paired and learned one another's language in the same classroom. The second and third graders, respectively, formed a separate class on Thursday and Fridays in the morning and practiced learning English and Spanish together. Opportunities for cooperative learning, natural communication, and learning from one another besides the teacher made this feature a challenging feature of the program.

IMPACT OF NATIVE LANGUAGE APPROACH ON ACADEMIC GROWTH OF LEP STUDENTS

How did LEP students benefit from use of their native language in reading and math, as well as in English? The following tables report the NCEs for each year of the project in chronological sequence.

Table 1 summarizes the findings of LEP instructional outcomes for 1984-85 (first year of the project). The information included in this table reports the results of the application of descriptive and analytical techniques.

Table 1. Instructional Outcomes of LEP Pupils[a] of Port Chester's Two-Way Bilingual Project, 1984-85.

OBJECTIVE	INSTRUMENT	MEAN (NCEs)[b] PRE	POST	DIFFERENCE	STATISTICAL OUTCOME
Reading in Spanish (comprehension)	CTBS	19	37	+18	Significant beyond .05[c]
English oral proficiency	BINL	7	12	+5	Sig. beyond .05
Reading in English (comprehension)	SDRT	5	18	+13	Sig. beyond .05
Mathematics in Spanish (total math)	CTBS	39	47	+8	Not significant

[a] LEP pupils = 13

[b] NCEs are rounded to nearest 10th.

[c] Results of Wilcoxon-Matched Pairs Test

These data manifest the initial and outstanding results of the first year of the project. NCE gains are evident in all academic areas with English and Spanish reading showing the most gain among the areas that were tested.

Table 2 summarizes the findings of LEP instructional outcomes for 1985-86 (second year of the project). The information included in this table also reports the results of the application of descriptive and analytical techniques.

Table 2. Instructional Outcomes of LEP Pupils[a] of Port Chester's Two-Way Bilingual Project, 1985-86.

OBJECTIVE	INSTRUMENT	MEAN (NCEs)[b] PRE	POST	DIFFERENCE	STATISTICAL OUTCOME
Reading in Spanish (vocabulary)	CTBS	59	66	+7	Significant[c] beyond .01
Reading in Spanish (comprehension)	CTBS	51	60	+9	Sig. beyond .01
English oral proficiency	BINL	43	69	+26	Sig. beyond .01
Reading in English (comprehension)	SDRT	8	24	+16	Sig. beyond .01
Mathematics in Spanish (total math)	CTBS	51	66	+15	Sig. beyond .01

[a] LEP pupils = 17

[b] NCEs are rounded to nearest 10th

[c] Results of Wilcoxon-Matched Pairs Test

Dramatic NCE gains are reported in Table 2: In every instructional area statistical significance was reached. In the second year of the Two-Way Bilingual project, all LEP students made remarkable academic growth in both English and Spanish. The growth in oral proficiency and reading skills in English was especially large.

Table 3 summarizes the findings of LEP instructional outcomes for 1986-87. The information included in this table reports the results of the application of descriptive and analytical techniques.

Table 3. Instructional Outcomes of LEP Pupils[a] of Port Chester's Two-Way Bilingual Project, 1986-87.

OBJECTIVE	INSTRUMENT	MEAN (NCEs)[b] PRE	POST	DIFFERENCE	STATISTICAL OUTCOME
Reading in Spanish (vocabulary)	CTBS	55	57	+2	Not significant (NS)[c]
Reading in Spanish (comprehension)	CTBS	44	47	+3	NS
English oral proficiency	BINL	33	64	+31	Sig. beyond .01
Reading in English (comprehension)	SDRT	8	16	+8	Sig. beyond .01
Mathematics in Spanish (total math)	CTBS	43	49	+6	NS

[a] LEP pupils = 19

[b] NCEs are rounded to nearest 10th.

[c] Results of Wilcoxon-Matched Pairs Test

These data demonstrate the effectiveness and viabilityof the bilingual approach: NCE gains were made in every academic area. Statistical significance was reached in both English oral proficiency and English reading--a real concern of those who doubt the transfer effects of using the child's native language in instruction. It should be pointed out in the last year of the project, half the class was new to the program while the other half had been in the program for 2-3 years, thereby accounting for the non-significant findings in Spanish reading.

Since the LEP population did not remain the same for the entire length of the project, an important question needs to be answered. How did the gains achieved by students in each instructional area for 1986-87 compare with those of the same students for the previous two years? To answer this question, two separate analyses follow. One reports the effect sizes (ES) for the last three years for <u>all</u> LEP students who participated in the Two-Way Bilingual project. Another tracks the progress of those LEP students who remained in the program for three and two years respectively.

Effect size allows the practitioner to gauge the magnitude and direction of the impact of an educational treatment on individuals.

As described by Glass et al. (1981), it is the difference between experimental and control posttest means divided by the control group's posttest standard deviation. However, this formula was adapted in the present study to take into account that no control group was available for comparison purposes. According to Light & Pillemer (1984), "effect sizes provide simple but useful estimates of how valuable a treatment really is" (pp.55-57), and under certain circumstances when certain assumptions can be made, the pretest means can be used as a "proxy" for control group performance. Given the validity of the assumption that LEP pupils in bilingual programs cannot be easily compared to a formal control group (because of mandated testing for eligibility, prior school program experiences, entry and exit requirements), standard deviations for pretest scores were used in those instances where they were available. Willig's meta-analysis of bilingual research (1985) substantiates the validity of this assumption when she deplores the inadequate design of previous bilingual research, especially those studies that make inappropriate comparisons of children in bilingual programs to children who are dissimilar in many crucial aspects.

Table 4 captures the magnitude and direction of the impact of the Two-Way Bilingual project on LEP students in all instructional areas for which data were available.

Table 4. Effect Sizes (ES) for LEP Students in Port Chester's Two-Way Bilingual Project, 1984-1987.

	Effect Size[a]		
ACADEMIC AREA	1984-85	1985-86	1986-87
Reading in English (SDRT)	+1.09	+1.77	+.62
English Oral Proficiency (BINL)	+.55	+1.13	+.88
Reading in Spanish (CTBS)	+1.11	+.45	+.15
Spanish Vocabulary (CTBS)	Not tested	+.33	+.11
Math in Spanish (CTBS)	+.31	+.65	+.22

[a] Effect size provides useful information on programmatic impact and may be interpreted as follows (J. Cohen, Statistical Power Analysis for the Behavioral Sciences, Academic Press, 1977):

.20 = small ES .50 = moderate ES .80 = large ES

These data demonstrate both the magnitude and direction of the impact in selected academic areas of the Two-Way Bilingual program on LEP performance. The average effect size (ES) for reading in English

was +1.16, well above the .80 level for a large effect size! This is undoubtedly an extraordinary accomplishment, providing substantive evidence of the effectiveness of the Two-Way Bilingual model as designed and implemented by Port Chester educators. The average ES for English oral proficiency was .85; for Spanish reading and vocabulary, they were .85 and .22, respectively, and the Math ES was .39.

These impressive effect size data are supplemented by a separate analysis of those particular students who remained in the project for three and two years respectively. This required tracking students who began the project in 1984 and 1985 through June 1987, forming two subgroups: 3-year and 2-year LEPs. Table 5 records their growth in NCEs for each year. Mean scores are used as part of the analysis. The reader is reminded that significant growth as indicated by tests of significance (Tables 1-3) and effect size (Table 4) was characteristic of all LEP pupils who participated in the project.

Table 5. NCE Growth Rates[a] of Three- and Two-Year LEP Pupils in Port Chester's Two-Way Bilingual Project, 1984-87.

	3-YEAR GROUP[b]			2-YEAR GROUP[c]	
ACADEMIC AREA	Yr.One (1984-5)	Yr.Two (1985-6)	Yr. Three (1986-7)	Yr.One (1985-6)	Yr.Two (1986-7)
English Reading	+9	+8	+9	0	+14
English Oral Proficiency	-2	+25	+12	+40	+17
Spanish Reading	+19	+11	-20	+6	+10
Spanish Vocab.	not avail.	+4	-8	+37	+2
Spanish Math	+19	+15	-15	+24	0

[a] Mean NCEs were used: In year one, Fall to Spring intervals; in year two, Fall to Spring; and in year three, Spring to Spring.
[b] n = 6 LEP
[c] n = 2 LEP

Consistent growth is evident from this analysis. With the exception of reading, vocabulary, and math in Spanish for the 3-year cohort in their last year of the project, growth in both "context-reduced" and "context-embedded" learning situations was maintained for these LEP students (Cummins, 1981). One interpretation for the negative Spanish scores in year three might have been the teacher's emphasis on mastery of English literacy skills(these were all fifth graders who were entering a middle school without a bilingual program). It might be added that a similar trend has been observed by McConnell (1987) in her analysis of cohort data for various bilingual programs. She speculates that such a trend "appears to occur only in geographic areas where there is strong community pressure to make a transition from use of Spanish to English. As children rely increasingly on English there is an actual drop in Spanish vocabulary level." (p.6)

In addition to these two subgroups, first year pupils in 1986-87 registered these NCE gains (Fall to Spring interval): English Reading: +6; English Oral Proficiency: +45; Spanish Reading: +13; Spanish Vocabulary: +12; and Spanish Math: +16 NCE.

One definite conclusion that emerges from these analyses of the longitudinal results of Port Chester's Two-Way Bilingual Program is the positive and cumulative academic effects of an integrated native language approach in the education of language-minority students. These data confirm the previous findings and rationales of authorities in bilingual and second language education about the beneficial effects of using a native language approach in teaching LEP children (Collier, 1987; Cummins, 1984; Hakuta & Gould, 1987).

IMPACT OF TWO-WAY PROGRAM ON ACADEMIC GROWTH OF EP STUDENTS

How did EP students benefit from learning a second language as they continued to learn regular academic subjects? The following tables report the NCEs for each year of the project, beginning with the first year.

Table 6. Instructional Outcomes of EP Pupils of Port Chester's Two-Way Bilingual Project, 1984-85.

OBJECTIVE	INSTRUMENT	MEAN (NCEs)[b] PRE	POST	DIFFERENCE	STATISTICAL OUTCOME
Spanish oral proficiency	BINL	1	1	0	Not significant[c]
Reading in Spanish (vocabulary)	CTBS	1	37	+36	Sig. beyond .01
Reading in Spanish (comprehension)	CTBS	1	36	+35	Sig. beyond .01
Reading in English (comprehension)	SAT	75	68	-7	Not significant
Mathematics in English (total)	SAT	71	53	-18	Sig. beyond .01

[a] EP pupils = 17

[b] NCEs are rounded to nearest 10th

[c] Results of Wilcoxon-Matched Pairs Test

Remarkable progress in learning Spanish as a second language (reading and vocabulary concepts) was recorded for the EP children in the first year of the project, reaching statistical significance. This combined 2-3 grade class was headed in the right direction in becoming functionally bilingual. However, NCE losses in math and English reading were unexpected: In the case of math, it was statistically significant. A combination of factors may have accounted for this. One overriding concern of the teacher during the first year of the project was the management of two separate curricula for both grade levels and teaching a second language.

Table 7 indicates the positive impact in second language learning and the negative trend in English reading and math that continued in the second year.

Table 7. Instructional Outcomes of EP Pupils[a] of Port Chester's Two-Way Bilingual Project, 1985-86.

OBJECTIVE	INSTRUMENT	MEAN (NCEs)[b] PRE	POST	DIFFERENCE	STATISTICAL OUTCOME
Spanish oral proficiency	BINL	1	10	+9	Not significant[c]
Reading in Spanish (vocabulary)	CTBS	48	52	+4	Sig. beyond .01
Reading in Spanish (comprehension)	CTBS	42	34	-8	Sig. beyond .01
Reading in English (comprehension)	SAT	70	60	-10	Sig. beyond .01
Mathematics in English (total)	SAT	54	57	+3	Sig. beyond .01

[a] EP pupils = 15

[b] NCEs are rounded to nearest 10th

[c] Results of Wilcoxon-Matched Pairs Test

These data indicate mixed results for EP pupils in the second year of the project. As a group they showed a 9 NCE gain in Spanish oral proficiency. Although loss in Spanish reading comprehension was evident, EP pupils continued to make headway in Spanish vocabulary. The math results were statistically significant: They gained 3 NCE points, overcoming the loss of the first year of the project. An NCE loss of 10 points in reading in English, however, caused concern for administrators, all that more important because of the loss noted in the first year. Classroom management concerns, problems in organizing differentiated reading groups for a combined 3-4 grade, and integrating second language instruction in the regular curriculum, continued to create difficulties for the teacher of the EP class.

Table 8 summarizes the findings of EP instructional outcomes in the last year of the project. The information in this table reports the results of the application of descriptive and analytical techniques.

Table 8. Instructional Outcomes of EP Pupils[a] of Port Chester's Two-Way Bilingual Project, 1986-87.

OBJECTIVE	INSTRUMENT	MEAN (NCEs)[b] PRE	POST	DIFFERENCE	STATISTICAL OUTCOME
Spanish oral proficiency	BINL	5	39	+34	Sig. beyond .01[c]
Reading in Spanish (vocabulary)	CTBS	48	89	+41	Sig. beyond .01
Reading in Spanish (comprehension)	CTBS	34	46	+12	Sig. beyond .05
Reading in English (comprehension)	SAT	61	57	-4	Not significant
Mathematics in English (total)	SAT	62	57	-5	Not significant

[a] EP pupils = 15-17

[b] NCEs are rounded to nearest 10th.

[c] Results of Wilcoxon-Matched Pairs Test

These third year results for learning Spanish as a second language are outstanding. Statistical significance was reached in Spanish oral proficiency, and Spanish vocabulary and reading. Although some NCE loss resulted in English reading and math, it was not statistically significant. One reason for the reading and math scores in English is due to the fact that the EP class had a new teacher between February and June of the last year of the project, the previous teacher having been removed from the project in the middle of the school year. The effect size data in Table 9 below demonstrate that the new teacher significantly reduced the magnitude of academic loss in reading and math which had been the trend for the first two and a half years of the project.

To answer the question about how the gains achieved by students in 1986-87 compared with those of the previous years, various analyses follow. One reports the effect sizes (ES) for the last three years for all EP students who participated in the Two-Way Bilingual project. Another approaches this question in terms of grade levels, since two separate class levels were taught by the same teacher for three years (except for the last four months when a new teacher was hired).

Table 9. Effect Sizes for EP Students in Port Chester's Two-Way Bilingual Project, 1984-1987.

	Effect Size[a]		
ACADEMIC AREA	1984-85	1985-86	1986-87
Reading in English (SAT)	-.53	-.56	-.36
Math in English (SAT)	-1.28	+.16	-.35
Spanish Oral Proficiency (BINL)	0	+.39	+3.77
Reading in Spanish (CTBS)	+7.00	-.80	+.54
Spanish Vocabulary (CTBS)	+3.00	+.25	+1.68

[a] Effect size provides useful information on programmatic impact and may be interpreted as follows (J. Cohen, Statistical Power Analysis for the Behavioral Sciences, Academic Press, 1977):

.20 = small ES .50 = moderate ES .80 = large ES

These data portray the mixed results of the impact of the Two-Way Bilingual project on EP performance from 1984-1987. The average effect size (ES) for reading in English for the three years was -.48, slightly less than "moderate." It should be pointed out that by the end of the third year, the ES was reduced from a moderate effect size (-.56) to one that was slightly above "small" (-.36), a reduction of 64%. This was most likely due to the strenuous efforts of the new teacher who began in February 1987. The average ES in math was -.49, an area of continued concern. In the case of second language learning, their academic performance was outstanding: the average effect sizes for Spanish reading and vocabulary development were +2.24 and +1.64, respectively. The ES in Spanish oral language proficiency was +1.38. These data--well above the level for "large efffect size"--on second language learning performance demonstrate the extent to which Two-Way Bilingual Programs can enrich the academic curriculum of EP students. Nevertheless, attention to curricula design, teacher concerns, and academic progress are warranted in making this model effective for EP pupils.

Another analysis was made of the third year data (1986-87) to identify more precisely those grade levels within the EP group that made the most gain (or loss) in selected academic areas. Since the EP class was a combined 4th and 5th grade, the results of this analysis are that much more important. Table 10 includes a breakdown by grade level for selected academic areas, NCE status and corresponding effect sizes.

Table 10. NCE Scores and Effect Sizes for EP Students in Grades 4 and 5 in Port Chester's Two-Way Bilingual Project, 1986-1987.

	Grade 4[a]		Grade 5[b]	
ACADEMIC AREA	NCE	ES[c]	NCE	ES
Reading in English (SAT)	-5	-.55	-2	-.13
Math in English (SAT)	-8	-.66	+3	+.19

[a] n = 9 [b] n = 6 [c] ES=Effect Size

These data pinpoint the 4th graders as making the greater loss in both reading and math NCEs while the 5th grade students made a small gain in math.

The results of these analyses are mixed. In one sense, they demonstrate that EP pupils can definitely benefit from a second language learning curriculum. The effect size data point in this direction: Two-Way Bilingual Programs offer this opportunity for enrichment through second language learning. In another sense, however, this opportunity should not be at the expense of continued progress in native language reading and math. Since the teacher variable was so critical in the original design of Port Chester's model that involved a combined two grade class, future implementation efforts require careful monitoring of student outcomes in relation to teacher performance. Student learning, being cumulative, will reflect not only individual differences among students, but also the subtle interactions between teacher beliefs and expanded teaching repertoire required for any new type of practice.

STUDENT PERCEPTIONS OF TWO-WAY BILINGUAL PROGRAM

How did EP and LEP pupils perceive their classroom environment? Another important aim of Port Chester's Two-Way Bilingual Program was to determine student perceptions of their classroom environment The My Class Inventory (MCI) (Fraser et al., 1982) was administered at the end of each year of the project in English and Spanish to both groups to ascertain students' level of satisfaction, friction, competitivenesss, difficulty, and cohesiveness within their classrooms. Representative items scored on a Yes or No basis include: "The pupils enjoy their schoolwork in my class;" "In our class the work is hard to do;"."Many children in our class like to fight;" "In my class everybody is my friend;" and "Most children don't care who finishes first". Table 11 reports these findings for the last year of the project, since they were typical for the first two years of the project with the exceptions noted below.

Table 11. Mean Scores of My Class Inventory (MCI) for EP and LEP Classes in Port Chester's Two-Way Bilingual Prject, June 1987.

TWO-WAY BILINGUAL CLASS	MCI VARIABLE[a] SATISFACTION (27)	FRICTION (24)	COMPETITIVENESS (21)	DIFFICULTY (24)	COHESIVENESS (18)
EP[b]	24.7	13.2	14.0	10.5	15.4
LEP[c]	24.7	12.8	14.5	16.1	16.4

[a] Number in parenthesis for each MCI variable is maximum score value for that scale.

[b] EP = 13 [c] LEP = 17

Application of the Mann-Whitney U Testyielded a significant difference for the MCI variable, "difficulty" ($p = .001$). One interpretation of this outcome is that the LEP group with more than half the entire class being newcomers to the project in the third year of the project perceived their classroom to be that much more difficult in terms of assignments, expectations, and learning English as a second language than the EP group. With regard to the other MCI variables--satisfaction, friction, competitiveness, and cohesiveness--no significant differences resulted. These data confirm the highly positive classroom environment in which both EP and LEP students perceived their learning of a second language and the continued development of their first language.

In the first year of the project, significant differences were noted in the areas of "friction" and "cohesiveness" between both groups, raising the speculation of cultural differences between groups. In the second year, the area of "difficulty" divided both groups, possibly due to the difficulties in learning two languages as well as

subject areas. Overall, MCI data revealed high satisfication with the implementation of the Two-Way Bilingual Program during its three year duration. This finding demonstrates that students in both groups were very satisfied with their learning experiences in this type of program.

LANGUAGE-LEARNING-AS-RESOURCE

These longitudinal data based on norm-referenced tests and student questionnaires are very encouraging for second language learning programs in general. Underlying these outcomes was the central belief held by teachers and administrators in the program that second language learning can and ought to be an enriching experience. Language-learning-as-resource in contrast tolanguage-learning-as-problem permeated the instructional practices of Port Chester's Two-Way Bilingual Program.

In the context of instructing language-minority students, this meant that their native language represented an important resource for further learning; knowledge of and through the native language facilitated deeper and richer learning experiences to occur in the bilingual classroom. One outcome of this approach was the transfer of ideas and experiences to new contexts characterized by a second language. In addition to becoming literate in one's native language and learning English-as-a-second-language, LEP students continued to develop their concepts in math, social studies, and science, thereby advancing their knowledge in these subject areas. One explanation of these academic outcomes can be found in the framework of Cummins (1981), who maintains that acquisition of a second language (L2) is a function of the level attained in one's first language (L1), what is referred to as the "linguistic interdependence hypothesis." Since Port Chester's Two-Way Bilingual Program emphasized the academic features of school learning in both Spanish and English--what Cummins terms "context-reduced" language use--, the underlying cognitive processes of both languages were continually tapped in this program.

In the case of teaching language-majority pupils, the Two-Way Bilingual Program made it possible for these students to learn a second language in a context supported not only by a teacher of Spanish but also by actual speakers of that language. In addition to one period of Spanish each day under the guidance of a Spanish teacher, twice a week students learned "side-by-side" with their LEP counterparts. Each student, in a way, served as a natural resource for one another. Whether in a cooperative learning group, or simply practicing vocabulary in English or Spanish, both groups began to perceive the benefits of bilingualism beyond their own immediate classroom situation. Although our evidence indicates some slippage in English language development--due to the complexity of implementing two separate curricula in one class and the teacher variable--nevertheless, EP students learned to understand, read, speak, and in some instances, to write a second language.

Two-Way Bilingual Programs, if properly monitored and supported, can recontextualize our present educational practices in learning second languages. According to Hakuta & Gould (1988), "Two-way bilingual programs seek to spread the benefits of bilingualism beyond the language-minority population....This approach avoids the isolation of the minority group....By granting it official status within the school, this approach adds prestige to the minority language and culture, thereby boosting both minority self-esteem and majority tolerance. Such programs may go a long way in encouraging intercultural

understanding" (p.44). Language-learning-as-resource is what Two-Way Bilingual Programs are all about.

References

Baecher, R.E., & Coletti, C.D. (1986). Two-way bilingual programs: implementation of an educational innovation. SABE Journal, Spring, vol. 2, no. 1, 42-58.

Bureau of Bilingual Education/Bureau of School and Categorical Programs Evaluation (Sept. 1984). Evaluation of two-way bilingual education programs. Albany, New York: New York State Education Department.

Cohen, J. (1977). Statistical power analysis for the behavioral analsyis. New York: Academic Press.

Coletti, C.D. (May 1984). Bilingual education for students/teachers (Project BEST). Proposal funded by Bureau of Bilingual Education, Albany, New York. Port Chester School District, New York.

Collier, V.P. (1988). Age and rate of acquisition of second language for academic purposes. TESOL Quarterly, vol. 21, no.4, 617-642.

Conover, W.J. (1980). Practical non-parametric statistics. Second edition. New York: John Wiley & Sons.

Cummins, J. (1981). The role of primary language development in promoting educational success for language minority students. In Schooling and language minority students: A theoretical framework. (pp.3-49). Los Angeles: California State University, National Evaluation, Dissemination and Assessment Center.

Education Week (Jan.20, 1988). 2 languages, one aim: 'Two-way' learning.

Fraser, B.J., Anderson, G.J., & Walberg, H.J. (1982). Assessment of learning environments: Manual for learning environment inventory (LEI) and my class inventory (MCI). Third edition. Bentley, Western Australia: Western Australian Institute of Technology.

Glass, G., McGaw, B., & Smith, M.L. (1981). Meta-analysis in social research. Beverly Hills, CA: Sage.

Hakuta, K., & Gould, L.J. (1987). Synthesis of research on bilingual education. Educational Leadership, March, 38-45.

Light, R.J., & Pillemer, D.B. (1984). Summing up: The science of reviewing research. Cambridge, MA: Harvard University Press.

McConnell, B.B., & Kendall, J.R. (April 1987). Application of the cohort model to evaluate bilingual programs: The "BELEPS" program. Paper presented at annual meeting of AERA, Washington, D.C.

New York Association for Bilingual Education (Winter 1985). Two-way bilingual programs in New York State. Bilingual Times, 1.

Perez, C. (May,1984). Announcement of availability of state bilingual categorical funds. Memorandum addressed to superintendents with approved part 154 Programs. Albany, New York: Bureau of Bilingual Education.

Tallmadge, G.K. (1976). Interpreting NCEs. Mountain View, CA: RMC Research Corporation.

Willig, A.C. (1985). A meta-analysis of selected studies on the effectiveness of bilingual education. Review of Educational Research, 55, no.3, 269-318.